

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Original) A tip-electrode comprising:
a housing defining a lumen for receiving an electrically conductive medium; and
an electrically conducting surface for coupling to a voltage or current generator.
2. (Original) The tip electrode of claim 1, wherein the housing comprises a target-facing end comprising an opening in communication with the lumen for delivering an agent through the opening to a target.
3. (Original) The tip electrode of claim 1, wherein the lumen comprises an electrically conductive medium.
4. (Original) The tip electrode of claim 1, wherein the housing comprises a tapered end.
5. (Original) The tip electrode of claim 1, wherein the electrically conducting surface comprises a coating at least partially coating walls of the housing defining the lumen.
6. (Original) The tip electrode of claim 1, wherein the tip-electrode comprises an element inserted into the lumen of the housing comprising the electrically conducting surface.
7. (Original) The tip electrode of claim 6, wherein the element is a cylinder, rod, filament, or wire.
8. (Original) The tip electrode of claim 6 or 7, wherein the electrically conducting surface is a structure penetrating the walls of the housing on one or both sides of the housing.
9. (Original) The tip electrode of claim 1, wherein the electrically conducting surface is a wire connected on the outside of the housing to a ring plate.
10. (Original) The tip electrode of claim 1, wherein the electrically conductive medium is a liquid.

11.(Original) The tip electrode of claim 1, wherein the electrically conductive medium is a gel.

12.(Original) The tip electrode of claim 1, wherein the electrically conductive medium comprises an agent for delivery to a target.

13.(Original) The tip electrode of claim 1, wherein the housing comprises a material selected from the group consisting of glass, fused silica, plastic, ceramic, an elastomeric material, a polymer, metal, a non-conducting material coated at least partially with a conducting material, and a conducting material coated at least partially with a non-conducting material.

14.(Original) The tip electrode of claim 2, wherein the housing further comprises a receiving end distal to the target-facing end and comprises an opening for receiving the electrically conductive medium.

15.(Original) The tip electrode of claim 1, wherein the tip-electrode further comprises a conducting surface which functions as a counter electrode.

16.(Original) The tip-electrode of claim 1, wherein the housing comprises a uniform inner diameter and uniform or varying outer diameter.

17.(Original) The tip-electrode of claim 1, wherein the housing comprises a uniform outer diameter and uniform or varying inner diameter.

18.(Original) The tip-electrode of claim 1, wherein the length of the tip electrode is less than about 10 cm.

19.(Original) The tip-electrode of claim 1, wherein the length of the tip electrode is less than about 500 mm.

20.(Original) The tip-electrode of claim 1, wherein the length of the tip electrode is less than about 50 mm.

21.(Original) The tip-electrode of claim 1, wherein the length of the tip electrode is less than about 1 mm.

22.(Original) The tip-electrode of claim 2, wherein the diameter of the opening at the target-facing end is less than or equal to about 5000 mm.

23.(Original) The tip-electrode of claim 2, wherein the diameter of the opening at the target-facing end is less than about 100 mm.

24. (Original) The tip electrode of claim 2, wherein the diameter of the opening at the target-facing end is less than about 50mm.

25.(Original) The tip-electrode of claim 2, wherein the diameter of the opening at the target facing end is less than about 10mm.

26.(Original) The tip-electrode of claim 2, wherein the diameter of the opening at the target-facing end is less than about 1 mm.

27.(Original) The tip-electrode of claim 2, wherein the diameter of the opening at the target-facing end is less than about 100 nm.

28.(Original) The tip-electrode of claim 2, wherein the diameter of the opening at the target-facing end is less than about 50 nm.

29. (Currently amended) An electrode plate comprising at least one mounting point for receiving a tip electrode, wherein tip electrode comprises a housing defining a lumen for receiving an electrically conductive medium and an electrically conducting surface for coupling to a voltage or current generator.

30.(Original) The electrode plate of claim 29, wherein the at least one mounting point comprises a flexible attachment point for receiving the tip electrode permitting vertical movement of a tip-electrode from the mounting point.

31.(Original) The electrode plate of claim 29, comprising a plurality of mounting points.

32.(Original) The electrode plate of claim 31, wherein the plate comprises a row of mounting points for forming a linear array of tip-electrodes.

33.(Original) The electrode plate of claim 31, wherein the plate comprises a plurality of rows of mounting points for forming a two-dimensional array of tip-electrodes.

34. (Currently amended) The electrode plate of claim 31, wherein the center-to-center distance of each mounting point corresponds to the center-to-center distance of wells in ~~an industry standard~~ a microtiter plate.

35.(Original) The electrode plate of claim 29, wherein the electrode plate comprises at least one interface point for a voltage or current generator.

36.(Original) The electrode plate of claim 29, wherein the electrode plate comprises at least one interface point for interfacing with a fluid delivery device.

37.(Original) The electrode plate of claim 29, wherein the electrode plate comprises at least two layers including a conducting layer and an insulating layer.

38.(Original) The electrode plate of claim 39 or 37, comprising a layer that functions as a counter electrode.

39.(Original) The electrode plate of claim 29, wherein the at least one mounting point comprises an aperture for receiving the tip-electrode.

40.(Original) The electrode plate of claim 29, wherein at least one tip-electrode is mounted to the electrode plate at the mounting point.

41.(Original) The electrode plate of any of claims 31-33, wherein a plurality of tip electrodes are mounted to the electrode plate.

42.(Original) The electrode plate of claim 29, wherein the plate comprises at least one microfluidic channel for delivering fluids to at least on tip electrode mounted to the plate.

43.(Original) A tip-electrode plate comprising a substantially planar plate on which at least one non-planar element is fabricated thereon, wherein an end of the non-planar element distal from the plate comprises an opening for exposing a target to an electric field and wherein inner walls of the non-planar element define a lumen.

44.(Original) The tip-electrode plate of claim 43, wherein the inner walls comprise an electrically conductive surface and/or the lumen comprises an electrically conductive medium.

45.(Original) The tip-electrode plate of claim 43, wherein the electrically conductive surface is a conductive coating which at least partially coats the inner walls of the reservoir.

46. (Original) The tip-electrode plate of claim 43, wherein the structure comprises a wire, rod or filament at the base of the lumen or penetrating one or both walls of the non-planar element.

47. (Original) The tip electrode plate of claim 43, wherein the end of the at least one non-planar element is tapered.

48. (Original) The tip electrode plate of claim 43, wherein the plate comprises a first layer comprising a plurality of reservoirs and a substantially planar second layer comprising a plurality of nonplanar elements elevated above the plate, wherein each nonplanar element comprises a target-facing opening centered above each reservoir in the first layer for exposing a target to an electric field, and wherein inner walls of the nonplanar element define a lumen communicating both with the reservoir and the opening.

49. (Original) The tip-electrode plate of claim 48, wherein the plate further comprises a counter electrode layer.

50. (Original) The tip electrode plate of claim 43 or 48, wherein reservoirs comprise an electrically conductive medium.

51. (Original) The tip electrode plate of claim 50, wherein the electrically conductive medium comprises an agent.

52. (Original) The tip electrode plate of claim 49, wherein the counter electrode layer contacts the electrically conductive medium.

53. (Original) The tip electrode plate of claim 43 or 48, wherein the reservoirs comprise an agent.

54. (Original) A kit comprising a tip electrode of claim 1 and a container for containing a target.

55. (Original) A kit comprising an electrode plate of claim 29 and at least one tip electrode for mounting on the electrode plate.

56. (Original) The kit of claim 55, further comprising a container for containing a target.

57. (Original) The kit of claim 55, wherein the electrode plate comprises at least one microfluidic channel.

58.(Original) The kit of claim 56, wherein the electrode plate and/or container comprises at least one microfluidic channel.

59.(Original) The kit of claim 56, wherein the container for containing the target is selected from the group consisting of a microtiter dish, a multi-well cell culture container, a petrie dish, polymeric substrate, a glass substrate, a microfluidic chip, and a membrane.

60.(Original) The kit of claim 55, wherein the kit further comprises at least one counter electrode.

61.(Original) The kit of claim 55, wherein the kit further comprises an electrically conductive medium for filling at least one tip-electrode.

62.(Original) The kit of claim 55, wherein the kit comprises at least one agent.

63.(Original) The kit of claim 55, wherein the kit comprises at least one cell.

64.(Original) A kit comprising a tip-electrode plate of claim 55, wherein the kit further comprises container for containing a target.

65.(Original) The kit of claim 64, wherein the tip-electrode plate and/or container further comprises at least one microfluidic channel.

66.(Original) The kit of claim 65, wherein the container for containing the target is selected from the group consisting of a microtiter dish, a multi-well cell culture container, a petrie dish, polymeric substrate, a glass substrate, a microfluidic chip, and a membrane.

67.(Original) The kit of claim 65, wherein the kit further comprises an electrically conductive medium for filling at least one reservoir.

68.(Original) The kit of claim 65, wherein the kit comprises at least one agent.

69.(Original) The kit of claim 65, wherein the kit comprises at least one cell.

70.(Currently Amended) A system comprising at least one tip electrode comprising:

an electrically conducting surface in contact with an electrode plate and a housing defining a lumen for receiving an electrically conductive medium, wherein the housing comprises a target-facing end comprising an opening in communication with the lumen for delivering an agent through the opening to a target, wherein the electrode plate

is connectable to a pulse generator for delivering a voltage or current pulse to the electrically conducting surface.

71.(Original) The system of claim 70, further comprising:
a container for containing a target.

72.(Original) The system of claim 70, wherein the system further comprises a mechanism for positioning the at least one tip-electrode in proximity to a target.

73.(Original) The system of claim 70, wherein the system further comprises a pulse generator in communication with the electrode plate for delivering voltage or current pulses through the at least one tip electrode.

74.(Original) The system of claim 70, further comprising at least one counter electrode.

75.(Original) The system of claim 70, wherein the lumen of the at least one electrode tip comprises an electrically conductive medium.

76.(Original) The system of claim 75, wherein the electrically conductive medium comprises an agent.

77.(Original) The system of claim 75, wherein the system further comprises a delivery mechanism for delivering a fluid and/or an agent to at least one tip electrode.

78.(Original) The system of claim 77, wherein the delivery mechanism further comprises one or more of: a pumping mechanism, a mechanism for electroosmosis, or a mechanism for electrophoresis of an agent through the lumen of the tip electrode.

79.(Original) The system of claim 70, wherein the system comprises a plurality of tip electrodes, each in electrical contact with the electrode plate.

80.(Original) The system of claim 79, wherein electrical pulses transmitted through each tip electrode are independently controlled through a system processor.

81.(Original) The system of claim 79, wherein the plurality of tip electrodes are arrayed in a row.

82.(Original) The system of claim 79, wherein the plurality of tip electrodes are arrayed in a plurality of rows.

83.(Original) The system of claim 71 or 79, wherein the electrode plate and/or container comprise one or more microfluidic channels.

84.(Original) The system of 70, wherein the system further comprises a detector, for detecting alteration of electrical properties or optical properties of a target proximity to a tip electrode and/or delivery of a fluid and/or agent to the target.

85.(Original) The system of claim 70, wherein the at least one tip electrode is detachable from the electrode plate.

86.(Original) The system of claim 70, wherein the at least one tip-electrode is an integral part of the electrode plate.

87.(Original) The system of claim 86, wherein the electrode plate comprises a first layer comprising a plurality of reservoirs and a substantially planar second layer comprising a plurality of nonplanar elements elevated above the plate forming the tip electrodes, wherein the target-facing opening of the tip electrode is centered above each reservoir in the first layer, and wherein the lumen of the tip electrode communicates with the reservoir.

88.(Original) The system of claim 70, wherein the lumen of the at least one tip electrode comprises an electrically conductive medium.

89.(Original) The system of claim 70, wherein the housing of the at least one tip electrode comprises a tapered end.

90.(Original) The system of claim 70, wherein the electrically conducting surface of the at least one tip electrode comprises a coating at least partially coating walls of the housing defining the lumen.

91.(Original) The system of claim 70, wherein the electrically conducting surface comprises an element comprising an electrically conducting surface inserted into the lumen of the housing.

92.(Original) The system of claim 70, wherein the element is a cylinder, rod or wire.

93.(Original) The system of claim 70, wherein the electrically conducting surface is a structure penetrating the walls of the housing on one or both sides of the housing.

94.(Original) The system of claim 70, wherein the electrically conducting surface is a wire connected on the outside of the housing to a ring plate.

95.(Original) The system of claim 70, wherein the electrically conductive medium is a liquid.

96.(Original) The system of claim 70, wherein the electrically conductive medium is a gel.

97.(Original) The system of claim 70, wherein the electrically conductive medium comprises an agent for delivery to a target.

98.(Original) The system of claim 70, wherein the housing comprises a material selected from the group consisting of glass, fused silica, plastic, ceramic, an elastomeric material, a polymer, metal, a non-conducting material coated at least partially with a conducting material, and a conducting material coated at least partially with a non-conducting material.

99.(Original) The system of claim 70, wherein the housing of the at least one tip-electrode further comprises a receiving end distal to the target-facing end and comprises an opening for receiving the electrically conductive medium.

100. (Original) The system of claim 70, wherein the at least one tip-electrode and/or electrode plate further comprises a conducting surface that functions as a counter electrode.

101. (Original) The system of claim 70, wherein the housing of the at least one tip electrode comprises a uniform inner diameter and uniform or varying outer diameter.

102. (Original) The system of claim 70, wherein the housing of the at least one tip electrode comprises a uniform outer diameter and uniform or varying inner diameter.

103. (Original) The system of claim 70, wherein the length of the at least one tip electrode is less than about 10 cm.

104. (Original) The system of claim 70, wherein the length of the at least one tip electrode is less than about 500 mm.

105. (Original) The system of claim 70, wherein the length of the at least one tip electrode is less than about 50 mm.

106. (Original) The system of claim 70, wherein the length of the at least one tip electrode is less than about 1 mm.

107. (Original) The system of claim 70, wherein the diameter of the opening at the target-facing end of the at least one tip electrode is less than or equal to about 5000 mm.

108. (Original) The system of claim 70, wherein the diameter of the opening at the target-facing end of the at least one tip electrode is less than about 100 mm.

109. (Original) The system of claim 70, wherein the diameter of the opening at the target-facing end of the at least one tip electrode is less than about 50mm.

110. (Original) The system of claim 70, wherein the diameter of the opening at the target-facing end of the at least one tip electrode is less than about 10mm.

111. (Original) The system of claim 70, wherein the diameter of the opening at the target-facing end of the at least one tip electrode is less is less than about 1 mm.

112. (Original) The system of claim 70, wherein the diameter of the opening at the target-facing end of the at least one tip electrode is less is less than about 100 nm.

113. (Original) The system of claim 70, wherein the diameter of the opening at the target-facing end of the at least one tip electrode is less than about 50 nm.

114. (Original) The system of claim 70, the electrode plate comprises at least one mounting point for receiving a tip electrode, and wherein the at least one

mounting point comprises a flexible attachment point for receiving the tip electrode permitting vertical movement of a tip-electrode from the mounting point.

115. (Original) The system of claim 114, wherein the electrode plate comprises a plurality of mounting points.

116. (Original) The system of claim 114, wherein the plate comprises a row of mounting points for forming a linear array of tip-electrodes.

117. (Original) The system of claim 114, wherein the plate comprises a plurality of rows of mounting points for forming a two-dimensional array of tip-electrodes.

118. (Currently amended) The system of claim 114, wherein the center-to-center distance of each mounting point corresponds to the center-to-center distance of wells in ~~an industry standard~~ a microtiter plate.

119. (Original) The system of claim 114, wherein the electrode plate comprises at least one interface point for a voltage or current generator.

120. (Original) The system of claim 114, wherein the electrode plate comprises at least one interface point for interfacing with a fluid delivery device.

121. (Original) The system of claim 114, wherein the electrode plate comprises at least two layers including a conducting layer and an insulating layer.

122. (Original) The system of claim 114 or 121, wherein the electrode plate comprises a layer which functions as a counter electrode.

123. (Original) The system of claim 114, wherein the at least one mounting point comprises an aperture for receiving the tip-electrode.

124. (Original) The system of claim 71, wherein the electrode plate and/or container comprises at least one microfluidic channel.

125. (Original) The system of claim 70, further comprising a processor for controlling one or more parameters selected from the group consisting of: delivery of fluid to the at least one tip electrode, delivery of at least one agent to at least one tip electrode, filling of the tip electrode with an electrically conductive medium, voltage or current pulse parameters, scanning of the electrode plate comprising the at least one tip electrode relative to a target, scanning of a target relative to a tip electrode, vertical movement of a

tip electrode, electrophoresis through a tip electrode, electroosmosis through a tip electrode, pumping of fluid through a tip electrode, and function of a system detector.

126. (Original) The system of claim 125, wherein the voltage or current pulse parameters are selected from the group consisting of pulse duration, waveform, and pulse amplitude.

127. (Original) The system of claim 125 or 126, wherein the system further comprises a user device comprising a graphical interface for displaying operations of the system and/or for altering system parameters.

128. (Original) The system according to claim 84, wherein the system further comprises a read-out device for displaying output from the detector.

129. (Original) The tip electrode of claim 1, wherein the tip electrode comprises a flexible portion.

130. (Original) The system of claim 70, wherein the at least one tip electrode comprises a flexible portion.

131. (Original) The system of claim 70, wherein the system further comprises a positioning mechanism for restricting vertical movement of the at least one tip electrode.

132. (Original) The system of claim 131, wherein the positioning mechanism is mounted to the target-facing end of the at least one tip electrode.

133. (Original) The system of claim 131, wherein the positioning mechanism is an integral part of the tip electrode.

134. (Original) The tip electrode of claim 2, wherein the tip comprises holes in the portion of the tip proximal to the target facing end.

135. (Original) The electrode plate of claim 41, wherein at least one tip comprises holes in a portion of the tip proximal to its target facing end.

136. - 221. (Cancelled).